

Docket #: McLees.E-01

APPLICATION

Of

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For

UNITED STATES LETTERS PATENT

On

Front Wheel Powered Skate Board with Accessory Engagable Frame and Suspension  
System

Sheets of Drawings: Four (4)

Docket #: McLees.E-01

TITLE: Front Wheel Powered Skate Board with Accessory Engagable Frame and Suspension System

## **BACKGROUND OF THE INVENTION**

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### RELATED APPLICATIONS:

This application is an improvement to the invention described in Provisional Patent Application, serial number 60/359,489 filed on February 25, 2002 and which is now expired.

### 10 INCORPORATION BY REFERENCE:

Applicant(s) hereby incorporate herein by reference, any and all U. S. patents, U.S. patent applications, and other documents and printed matter cited or referred to in this application.

### FIELD OF THE INVENTION:

15 This invention relates generally to skate boards and similar sport and utility conveyance devices, and more particularly to such a device having motor power and the ability to receive a wide range of accessories.

### DESCRIPTION OF RELATED ART:

20 The following art defines the present state of this field:

Brickson, U.S. Des. 150,401 describes a coaster car design.

Cohen, U.S. Des. 330,394 describes a motorized skateboard design.

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Johnson, U.S. 4,043,566 describes a skateboard including a brake assembly for slowing and stopping the vehicle. A pivotal member on the board is provided with a depending rubber stop for engagement with the ground surface when the member is tilted by the heel of the shoe of the skater.

Spitzke, U.S. 4,199,165 describes a skid accessory for skateboards adapted to be mounted at the end of the board between the wheel supporting trucks and the end of the board to protect the board from engagement with the ground and to act as a braking device by frictional engagement with the ground.

Martin, U.S. 5,020,621 describes an electrically driven brake controlled skateboard employing an electric motor and associated battery mounted on the bottom of its foot supporting board employs a pulley arrangement whereby the initial slipping of its belt acts as a clutch for transferring rotational power from the motor to a U-grooved drive wheel of the skateboard. The U-groove is low cut so that the drive belt is partially exposed to the road surface. A dual-purpose tether mounted brake control and on/off switch is used to control the braking of the skateboard and the energizing of the drive motor.

Hsu, U.S. 5,330,026 describes a remote controlled electric skate-board having a motor to drive two sets of sun and planet gear units connected with a pair of rollers rotated to move the skate-board by a remote controller transmitting a signal to an electronic circuit carried on the board to start or to stop the motor so that the skate-board may be moved or stopped by electric power in addition to human force.

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Kaufman, U.S. 5,381,870 describes a motorized skateboard including a tubular frame having a first and second axle mounted in a parallel relationship about opposed ends of the frame, with a drive motor directed through a drive belt to a rear driven sprocket. An optional configuration of the invention utilizes the rear driven sprocket mounted to a constant velocity joint to permit rear steerage of the skateboard. The skateboard is arranged with pivoted front arms as required to provide for shock-absorbing suspension to the skateboard structure. The utilization of an independent front suspension is cooperative with a tapered rear roller support wheel structure to permit steerage of the organization. The independent

front suspension includes frontal steering controlled by the front boot including a tie rod and spindle configuration.

5 Ondrish, Jr., U.S. 5,950,754 describes a multi-terrain riding board including an elongate deck mounted on a chassis, a front axle assembly pivotally coupled with the chassis and including a pair of horizontal spindles rotatable about respective vertical axes, a pair of wheels mounted for rotation about the spindles, a pair of tie rods connected between the chassis and the spindles to transfer tilting movement of the chassis into rotation of the spindles about the vertical axes, a rear axle coupled with the chassis, and a rear wheel  
10 rotatably mounted on the rear axle. In one embodiment, the rear axle is fixedly connected to the chassis so that the rear wheel cambers in response to angulation of the deck; however, the rear axle can be pivotally coupled with the chassis and provide with a pair of spindles and tie rods to steer like the front axle assembly if desired. Preferably, horizontal tension springs are connected between the spindles and a bottom portion of the chassis to help  
15 stabilize the deck of the riding board. An engine or motor can be mounted within the chassis between the front and rear axle assemblies, in which case the deck is preferably hingedly connected with the chassis to permit pivotal movement of the deck from a lowered position resting on the chassis to an elevated position allowing access to the engine.

20 Chen, U.S. 2003/0151214 describes a skateboard comprising a board, two wheel units attached to an underside of the board, and a braking member attached to the underside of the board. The braking member includes at least one metallic braking block that is in contact with ground during braking. The metallic braking block sparks during braking to provide an amusement effect.

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Our prior art search with abstracts described above teaches: a design for a coaster board having three wheels with a at least one wheel in a frontal position, a design for a motorized skateboard with two wheels, a non-motorized skateboard with three wheels, with one wheel in front, a skateboard skid accessory, an electric motor powered skateboard with integral

brakes, a remote controlled electric skate board, a motorized skateboard apparatus, a three wheeled multi-terrain riding board, and a braking member for a skateboard, but does not teach a three wheeled skateboard with the at least one forward wheel powered, a board with forward and rearward receivers for accessory attachments, and a push-pull driving arrangement for a skateboard. The present invention fulfills these needs and provides further related advantages as described in the following summary.

### **SUMMARY OF THE INVENTION**

10 The present invention teaches certain benefits in construction and use which give rise to the objectives described below.

A skateboard has a platform supported on a tubular frame. The frame is engaged with a pair of wheel trucks, one with a at least one wheel, the other with a pair of wheels. An electrical motor, and a power source are mounted below the platform to the frame. The at least one wheel is positioned proximate a forward end of the platform, and the pair of wheels are positioned proximate a rearward end of the platform. The motor engages the at least one wheel and is able to be tuned on and off by a remote switch accessible to a hand or foot of the rider. A front and rear receivers enable attachment of a wide range of accessories including a seat, handle bar and lights.

A primary objective of the present invention is to provide an apparatus and method of use of such apparatus that yields advantages not taught by the prior art.

25 Another objective is to provide such an invention capable of being driven by a front wheel drive that may be lifted from the riding surface when necessary or when desired.

A further objective is to provide such an invention capable of receiving a wide range of accessories in a snap-in arrangement for convenience.

A still further objective is to provide such an invention capable of being driven by front and rear wheels at the same time.

- 5 A further objective is to provide such an invention capable of sharp and effective turning.

A further objective is to provide such an invention capable of having less wheel surface in contact with the ground surface so as to provide less friction and resistance.

- 10 A further objective is to provide a skate board wherein the rider's weight is concentrated in the rear of a front wheel driven machine so that there is less strain on the drive system so that a less powerful motor may be applied and smaller batteries may be used with longer battery life between charges.

- 15 Other features and advantages of the present invention will become apparent from the following more detailed description, taken in conjunction with the accompanying drawings, which illustrate, by way of example, the principles of the invention.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

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The accompanying drawings illustrate the present invention. In such drawings:

Figure 1 is a perspective view of the invention;

Figure 2 is similar to Fig. 1 showing a front wheel suspension arrangement thereof;

Figure 3 is similar to Fig. 1 showing a dual drive system thereof;

- 25 Figure 4 is an exploded perspective view showing details of a frame thereof;

Figures 5-7 are side elevational views thereof showing application of snap-in accessories of the invention;

Figures 8-10 are perspective views thereof showing application of further accessories of the invention.

## **DETAILED DESCRIPTION OF THE INVENTION**

The above described drawing figures illustrate the invention in at least one of its preferred  
5 embodiments, which is further defined in detail in the following description. Those having  
ordinary skill in the art may be able to make alterations and modifications in the present  
invention without departing from its spirit and scope. Therefore, it must be understood that  
the illustrated embodiments have been set forth only for the purposes of example and that  
they should not be taken as limiting the invention as defined in the following.

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As shown in the figures, see Fig. 1 for instance, the present invention is an improved  
skateboard apparatus comprising a platform 10 having a forward end 12, an opposing  
rearward end 14, a top surface 16 and an undersurface 18. The platform 10, preferably of  
wood or plastic construction, is engaged with a tubular metal frame 20 shown in Fig. 4, and  
15 the frame 20 is further engaged with a pair of wheel trucks 30, 40, a means for driving 50  
and an electrical power source 55, as best seen in Fig. 4. One of the wheel trucks 30 mounts  
a at least one wheel 32 positioned proximate the forward end 12 of the platform 10 while the  
other of the wheel trucks 40 mounts a pair of wheels 42, 44 positioned proximate the  
rearward end 14 of the platform 12. The means for driving 50, preferably an electric motor,  
20 is engaged mechanically; by a drive belt 52 or direct meshing gears, or other drive train  
means, with the at least one wheel 32 and is electrically engaged by cable 62 with the  
electrical power source 55 for driving the at least one wheel 32 in moving the apparatus on a  
riding surface 5 (Fig. 5). Thus, with a rider (not shown) standing on the top surface 16 of the  
platform 10, the at least one wheel 32 can be driven to move the platform 10 and rider over  
25 the riding surface. The apparatus is preferably a front wheel driven skate board.

Preferably, as best shown in Figs. 4, a means for actuating 60 is positioned proximate the top  
surface 16 and is electrically interconnected, by the electrical cable 62, with either the  
driving means 50 or the power source 55, enabling power control of the driving means 50 as

actuated by a foot of the rider. Such an actuating means 60, for instance, is preferably an electrical toggle switch with each actuation reversing the switching sense. Alternately, the electrical cable 62 may be of such length as to be actuated by a hand of the rider as shown in Figs. 8-10.

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Preferably, the forward 22 and rearward 24 ends of the tubular frame 20 each provides a receiving means 26 for receiving an extension piece that is removeably engagable with either of the receiving means 26. Such a receiving means 26 is preferably a tubular aperture with a snap-in locking feature of any type well known to those of skill in the art, or it may be a tube in tube arrangement with set screw 28, as shown in Fig. 8. The extension piece may be any one of several utility accessory parts including a fender brake 70 which is positioned forward of the platform 10 and proximal to the at least one wheel 32 as shown in Fig. 6, or an upwardly extending T-bar 71 positioned forward of the platform 10 and extending upwardly so as to provide a gripping element for the rider to grasp, as shown in Fig. 7, a hand brake actuator 82 (Fig. 8) with cable actuator 82' preferably enabling dynamic braking by reversing the sense of the field in the motor 50, or alternately by an bicycle-type caliper brake (not shown) preferably engaging wheel 32, or a wheely bar 73 positioned rearward of the platform 10, as shown in Fig. 6, or headlights 75, (Fig. 5), tail-lights or reflectors 76 (Fig. 8). Electrical power is supplied to these lights 75, 76 from the power source 55 by conductors (not shown) mounted within the frame 20 as would be easily enabled by one of skill in the art, so that when the lights 75, 76 are engaged with the frame 20 (Figs. 5, 8), electrical interconnections are made as well.

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Preferably, the power source 55, as shown in Fig. 5, comprises a heavy duty dry cell type battery 59, which may be made up of a plurality of cells mounted in tubes as is well known in the art, and further comprises a battery charging circuit 57, well known in the art, enabled for charging the battery 59, preferably at 12 volts DC, from an AC utility outlet at either 115 volts, 60 Hz, or 220 volts at 50 Hz.

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Preferably, a manual brake 77 (Fig. 9) is positioned proximate the top surface 16 at the forward end 12 of the platform 10 and is mechanically engagable with the at least one wheel 32 for frictional braking as actuated by a foot of the rider. Spring 77' is positioned to maintain the brake 77 in an "up" position until the rider presses downwardly on the brake 77 which forces a brake pad 77" into contact with the wheel 32. An alternate manual brake 78 is positioned proximate the top surface at the rearward end of the platform and mechanically engagable with one or both of the rear wheels 42, 44 enabling frictional braking as actuated by a foot of the rider. A short leaf spring 78' is engaged for maintaining a space between a brake pad 78" and the wheels 42, 44 (Fig. 7).

As shown in Fig. 8, a seat attachment 90 is mountable onto the frame 20 and extends upwardly therefrom. Accommodation is made in the platform 10 for mounting bolts 92. Likewise, a handle bar 80, similar to T-bar 71 is preferably mounted to frame 20 in the same manner. See Fig. 8.

Preferably, one or both wheel trucks 30, 40 provides a shock mounting 100 comprising at least one means for shock absorbing as shown in Fig. 2. Such shock mounting may comprise a at least one spring or equivalent resilient material, or two or more such shock absorbing elements positioned at the center of the truck, as shown in Fig. 2, or dual springs, etc. mounted laterally to wheel 32, in any manner that is well known in the art. To achieve maximum effectiveness, the trucks 30, 40 are preferably mounted as swing arms 110 (swing arm mounting means) with one end secured pivotally by a hinge member 110' while the free end is clear to move against the shock mounting 100, as shown in Fig. 2.

Preferably, the means for driving 50 is further engaged mechanically with the pair of wheels 42, 44, the driving means comprising individual motors engaged individually with the at least one wheel 32 and with the pair of wheels 42, 44 for driving all of the wheels 32, 42, 44 in moving the apparatus along the riding surface 5 in a push-pull arrangement. Alternately, a

at least one motor is preferably engaged with both wheel 32 and at least one of the wheels 42, 44 to achieve the same objective.

5 The use of a front wheel drive in the present invention is critically superior to rear wheel drive because of less resistance, less friction between the front wheel and the rider surface and results in less strain on the drive system including less drain on the battery.

10 The enablements described in detail above are considered novel over the prior art of record and are considered critical to the operation of the instant invention and to the achievement of the above described objectives. The words used in this specification to describe the invention and its various embodiments are to be understood not only in the sense of their commonly defined meanings, but to include by special definition in this specification: structure, material or acts beyond the scope of the commonly defined meanings. Thus if an element can be understood in the context of this specification as including more than one  
15 meaning, then its use must be understood as being generic to all possible meanings supported by the specification and by the word or words describing the element.

20 The definitions of the words or elements of this described invention and its various embodiments are, therefore, defined in this specification to include not only the combination of elements which are literally set forth, but all equivalent structure, material or acts for performing substantially the same function in substantially the same way to obtain substantially the same result. In this sense it is therefore contemplated that an equivalent substitution of two or more elements may be made for any one of the elements in the invention and its various embodiments below or that a at least one element may be  
25 substituted for two or more elements in a claim.

Changes from the claimed subject matter as viewed by a person with ordinary skill in the art, now known or later devised, are expressly contemplated as being equivalents within the scope of the invention and its various embodiments. Therefore, obvious substitutions now or

later known to one with ordinary skill in the art are defined to be within the scope of the defined elements. The invention and its various embodiments are thus to be understood to include what is specifically illustrated and described above, what is conceptually equivalent, what can be obviously substituted, and also what essentially incorporates the essential idea  
5 of the invention.

While the invention has been described with reference to at least one preferred embodiment, it is to be clearly understood by those skilled in the art that the invention is not limited thereto. Rather, the scope of the invention is to be interpreted only in conjunction with the  
10 appended claims and it is made clear, here, that the inventor(s) believe that the claimed subject matter is the invention.